

Results of Breeding

Dihybrid Cross

A dihybrid cross is a cross between F1 offspring (first generation offspring) of two individuals that differ in two traits of particular interest. For example: RRyy/rrYY or RRYy/rryy parents result in F1 offspring that are heterozygous for both R & Y.

A dihybrid cross is often used to test for dominant and recessive genes in two separate characteristics. Such a cross has a variety of uses in Mendelian genetics.

Meiosis is the cellular process of gamete creation; it is where sperm and eggs get the unique set of genetic information that will be used in the development and growth of the offspring of the mating. The rules of meiosis as they apply to the dihybrid are codified in Mendel's First Law and Mendel's Second Law also called the Law of Segregation and the Law of Independent Assortment.

For genes on separate chromosomes each allele pair shows independent segregation. If the first filial generation (F1 generation) produces four offspring, the second filial generation, which occurs by crossing the members of the first filial generation, shows a phenotypic (appearance) ratio of 9:3:3:1.

Test Cross

In genetics, a test cross, first introduced by Gregor Mendel, is used to determine if an individual exhibiting a dominant trait is homozygous or heterozygous for that trait. More simply, test crosses determine the genotype of an individual with a dominant phenotype.

Test crosses involve breeding the individual in question with another individual that expresses a recessive version of the same trait. If all offspring display the dominant phenotype, the individual in question is homozygous dominant; if the offspring display both dominant and recessive phenotypes, then the individual is heterozygous.

In some sources, the "test cross" is defined as being a type of backcross between the recessive homozygote and F1 generation.

If the individual being tested produces any recessive offspring, its genotype is heterozygous. If all the offspring are phenotypically dominant, its genotype is homozygous.

Selective Breeding

Selective breeding is the process of breeding plants and animals for particular genetic traits.

Typically, strains which are selectively bred are domesticated, and the breeding is sometimes done by a professional breeder. Bred animals are known as breeds, while bred plants are known as varieties, cultigens, or cultivars. The cross of animal's results in what is called a crossbreed and crossbred plants are called hybrids. The term selective breeding is synonymous with artificial selection.

In animal breeding techniques such as inbreeding, line breeding and out crossing are utilized. In plant breeding similar methods are used. Charles Darwin discussed how selective breeding had been successful in producing change over time in his book, Origin of Species. The first chapter of the book discusses selective breeding and domestication of such animals as pigeons, dogs and cattle. Selective breeding was used by Darwin as a springboard to introduce the theory of natural selection, and to support it.